10 m/s there seems to be little change, some of them even increasing slightly within the stratosphere (see fig. 1). As soon as the surface layers are left behind the wind direction becomes remarkably constant and remains nearly the same from 4 kilometers up to the highest point reached—no effect is seen in the direction on entering the stratosphere. The horizontal pressure and temperature gradients were computed from the winds on a few typical days, according to the procedure given in the *Computer's Handbook*. The resulting curves show that the horizontal pressure gradient remains nearly constant throughout the troposphere but suddenly begins to decrease with remarkable rapidity as soon as the tropopause is passed, and approaches zero at about 18 or 20 kilometers; however, even if the pressure gradient never increased above the value shown at the highest level for which results were available, the decrease in density would account for winds of considerable velocity. Within the troposphere the horizontal temperature gradient at right angles to the average direction of the wind increases gradually with height, the air being colder over the cyclone than over the anticyclone, but on entering the stratosphere a very sudden and large reversal takes place and the gradient changes to a value somewhat greater than that at the top of the troposphere, and in the reverse direction; after a kilometer or two this value decreases again and becomes very nearly zero at heights of 18 or 20 kilometers.—*E. W. W.*

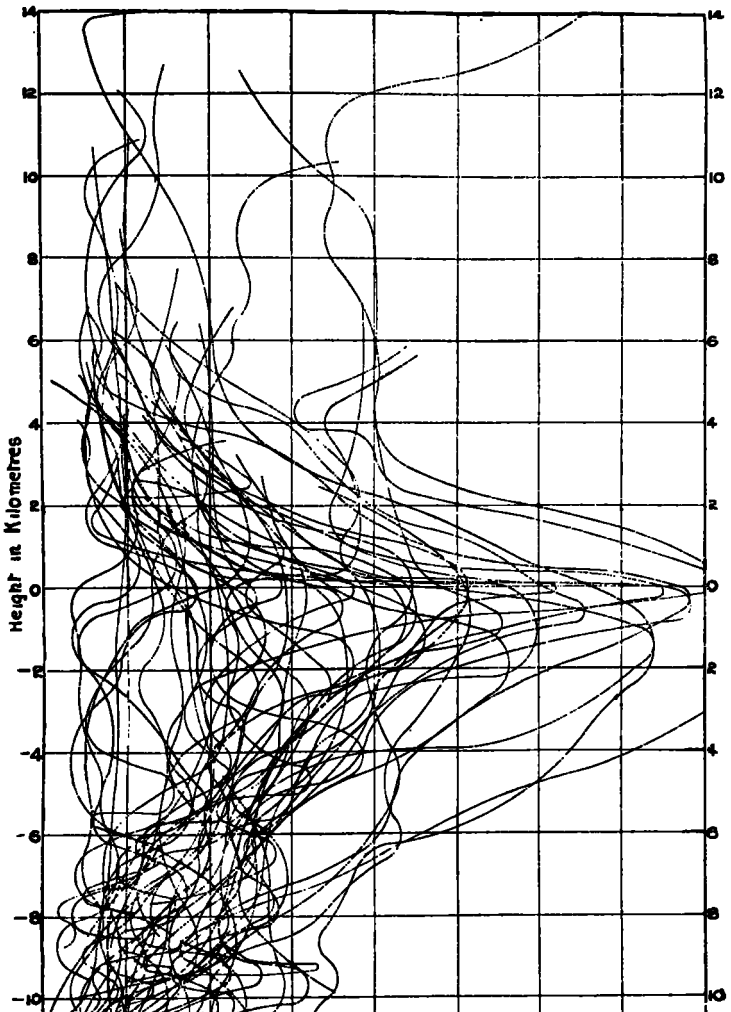

FIG. 1.—Variation of wind velocity with height. (Heights are taken relative to the base of the stratosphere as given by temperature records.)

ON AN APPARATUS FOR THE STUDY OF THE FORMATION AND PERSISTENCE OF FOG.

By A. TRILLAT and M. FOUASSIER.

[Abstracted from *Comptes Rendus, Paris Acad.*, Mar. 17, 1919, pp. 570-572.]

The condensation of water vapor in the air depends not only upon the quantity of vapor and the changes of temperature, but also upon whether the particles are solid, liquid, or ionized. These factors have been studied principally by Coulier, Mascart, Aitken, Wilson, and Langevin. The present studies were made during the war to devise, if possible, some apparatus which could be employed in forecasting the possibilities of fog. The work rested upon two premises: First, that the possibility of fog in air of given temperature, pressure, and humidity depends chiefly upon the more or less persistent presence of solid or liquid particles; and, second, the expansion necessary to provoke the appearance of fog is less when the number of active particles in the air is great.

The instrument as described in an abstract by R. Corless[1] is as follows: "The apparatus consists of a closed glass vessel of 10 liters capacity, provided with an exhausting pump and a mercury manometer; also with a device for noting when fog of a standard quality has been produced. The air to be tested having been introduced into the vessel, the pressure inside is reduced by means of the pump until the standard fog is produced. The reading of the manometer then gives a measure of the difficulty of production of fog."

The nuclei provided by smoke from the combustion of vegetable and animal products were found to be especially active.

Ammonium salts, magnesium chloride, and emanations of mineral acids possess to a great degree the property of condensing atmospheric moisture about them. On the other hand, the carbonates, silicates, and oxide of iron, which constitute a large proportion of atmospheric dust are less active and less persistent in forming fog. Microorganisms are also effective as nuclei. Some particles are soluble and some insoluble in water vapor, the first appearing to form the more persistent fogs. These experiments, it is pointed out, may explain the difference in the persistence of fogs between cities and open fields.—*C. L. M.*

"STORMS OF COLD" AND THEIR PATHS.

By A. BALDIT.

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Thunderstorms are usually divided into two classes, (*a*) heat storms and (*b*) storms in depressions. The former are usually local in character, the latter accompany line-squalls, which are experienced in the southern sectors of depressions. The author describes a third type of thunderstorm, namely, "storm of cold," which occurs in a cold zone of air advancing from the north into a region where temperature is high, and upper winds are from the south. In these circumstances cumulo-nimbus clouds developing into thunderstorms are formed on the southern boundary of the cold wave and are carried northward by the upper south wind in a direction opposite to that of the north wind at the surface. Thus the storms travel backwards through the zone of cold air.—*R. C.*

[1] Science Abstracts, July, 1919, pp. 310-311.